REMARKS

Applicant has carefully considered the Office Action dated June 2, 2006 and provides the following response thereto. Applicant presents this amendment in a sincere effort to place the application in consideration for allowance. Accordingly, reconsideration is respectfully requested.

In this amendment, Claims 11-30 have been added. Claims 1-10 are canceled. Accordingly, Claims 11-30 are presented for consideration. No new matter has been added.

CLAIM REJECTIONS UNDER 35 U.S.C. SECTION 112

In the Office Action, Claims 3-4 and 7-10 were rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention. In view of the cancellation of Claims 3-4 and 7-10, Applicant respectfully requests that the rejection of Claims 3-4 and 7-10 be reconsidered and withdrawn.

CLAIM REJECTIONS UNDER 35 U.S.C. §101

In the Office Action, Claims 1-10 were rejected under 35 U.S.C. §101 as being directed to non-statutory subject matter.

The present invention relates to a method and system for controlling and optimizing a process having controllable variable inputs. For the first time, a probability value of obtaining an optimized result is obtained by representing a first value (representing a first type of information) on a vector-based scale using a magnitude and correlating a second value (representing a second type of information) using a direction, both in relation to the same reference point.

For example, in one preferred embodiment, different types of variable information are collected and a comparative value, such as an average, is calculated for each variable input. A vector-based scale also is determined having a reference point based on characteristics of the different types of information. Preferably, the scale allows for entry of one of the

comparative values based on a magnitude of the value from the same reference point. The other comparative value is then correlated to a direction in relation to the reference point and allowed entry on the scale. The invention then provides for finding a probability value for obtaining an optimized result by mapping the value to the scale. In one example, as explained on page 11, lines 10-31 of the disclosure, the probability value is calculated by summing vectorally a plurality of line segments mapped on the scale and dividing the vector sum by a radius length of the scale (Formula 7).

New independent Claim 11 recites a method that includes (a) determining a value for each of at least a first type and a second type of information from the inputs based on pre-determined criteria; (b) generating a vector-based scale having a reference point based on characteristics of the at least first and second type of information, the scale providing for entry of at least one of the values resulting from step (a) based on a magnitude of the value from the reference point and correlating at least another of the values resulting from step (a) to a direction in relation to the reference point; (c) calculating a probability value for obtaining an optimized result by mapping said value to said scale; and (d) adjusting at least one of the inputs of the process based on the probability value. Independent Claim 21 recites similar limitations.

It is understood that to meet the requirements of 35 U.S.C. §101 "(t)he claimed invention as a whole must accomplish a practical application. That is, it must produce a useful, concrete and tangible result." As noted above, new Claim 11 clearly recites a method for controlling and optimizing a process having controllable variable inputs that produces a useful, concrete and tangible result. For example, in one preferred embodiment, the invention provides a reliable procedure and system for measuring different variable inputs, such as individual competence and commitment to set goals, and calculates a probability of those individuals reaching those goals. As such, management of a company can use the calculated probability to take reparative action to change the individuals assigned to attain a desired goal. In addition, the present invention allows the competence of a company in relation to its goals to be presented clearly and reliably to the owners. (Application, pg. 4, lines 4-20; FIGS. 1-8).

As explained in the specification, the present invention may be adapted for several other useful, concrete and tangible results. For example, the invention can be used in determining the probability of improving product sales by way of evaluation of customer relations and product development needs. (Application, pg. 4, lines 22-34). The invention can also be used in analyzing different strategic processes in the industry, such as make or buy-analysis or development analysis of a company. For example, as discussed on page 15, line 32 - page 16, line 22, of the specification and shown in FIG. 10, a company's development investments can be analyzed in relation to the company's turnover using the present invention.

The invention is also applicable with processes, where the process parameters, such as temperatures, pressure, content etc. are measured. As explained in the specification, these parameters can be situated on scales formulated for these processes and a probability for a followed event's occurrence is calculated. By setting alarm boundaries at desired points, the process may be altered when the calculated probability for process failure increases. (Application, pg. 16, lines 24-32).

Support for new Claims 11-30 can be found throughout the specification and drawings as originally filed.

Therefore, it is respectfully requested that the rejections of Claim 1-10 under 35 U.S.C. §101 be reconsidered and withdrawn. It is also respectfully submitted that Claims 11-30 are directed to statutory subject matter.

In view of the foregoing Amendments and remarks, entry of the Amendments to Claims 11-30; and favorable consideration and allowance of pending Claims 11-30 are respectively and earnestly solicited.

RESPONSE TO REQUEST FOR INFORMATION UNDER 37 C.F.R. 1.105

In response to the Examiner's requirement that Applicant provide the citation and a copy of each publication in which Applicant authored or co-authored which describes the subject matter of the Non Patent Literature found on "World class design by world class methods" dated 1997 from ICED 97, Applicant respectfully submits a copy of "World class

design by world class methods" dated 1997 from ICED 97, and states that he is not an author or co-author of any other publication which describes the disclosed subject matter of the "World class design by world class methods" publication dated 1997 from ICED 97.

In response to the request that Applicant provide the source for formulas provided in the specification on pages 10-14, the formulas disclosed on pages 10-14 rely on commonly known relationships in the fields of statistics, probability and vector algebra, but are combined in a new way making it possible to control and optimize a process as described in the application and defined by the Claims.

Commonly known relationships in the fields of statistics and probability literature may be found in, for example, DeGroot, M. H. & Schervish, M.J,:Probability and Statistics. Addison-Wesley (2001) and Dougherty, E.R.: Probability and Statistics for Engineering, Computing and Physical Services. Prentice-Hall (1990), respectively. Commonly known relationships in the field of vector algebra may be found in, for example, Copeland, A.H.Sr., Geometry, Algebra and Trigonometry by Vector Methods, MacMillan, 1962.

In response to the requirement that any products or services that have incorporated the disclosed prior art be identified, we have inquired of Applicant for this information and are presently unaware of any products or services that incorporate the disclosed prior art at this point in time. In the event we become aware of any products or services that have incorporated the disclosed prior art, we will supplement our response to this requirement accordingly.

Respectfully submitted,

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INTRANET SUPPLIER SYSTEM

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Pulp and Paper Industry, PROSIT, Manufacture, Subcontractor network, Information flow analysis, Re-engineering, Parametric product model, Intranet applications

1. Introduction

Product development time is often the dominant concern in the project execution, especially on unit product manufacturing [Eppinger & Ulrich 1995]. Manufacture has to wait final manufacturing documents so that total lead time will come longer and costs tend to increase. Information transfer between different responsible persons has become the most important issue in modern global industry. The one that can successfully handle information transfer can benefit different national features and increase their competence.

This presentation will study the design and manufacturing phase of Tubel®-evaporator products. Tubel is a falling film tube-element evaporator developed by Tampella Power Inc, currently known as Kvaerner-Pulping Inc., Power Division. The Tubel evaporator products feature a new technology to control scaling in evaporation, combining the advantages of tube and plate element construction: Evaporated liquid flows on the outer surface of the heatsurface tubes effectively reducing the risk of plugging and the tube construction can be designed for different, even high, steam net pressures in the mill. To further ensure the a high quality level, the heat surface elements are welded by the same automated welding system that is used in the manufacture of boilers. As the tube elements are made of standard tubes, no special equipment is needed for repair and maintenance.

The presentation outlines how the above mentioned problems were solved in the Tubel evaporator case by using the information flow analysis, parametric product model and a new Intranet Supplier System. As the result of the work, many of the critical design steps affecting the total lead time were fully automated. New design and manufacture system developed automatically creates documents for all actions needed to manufacture TUBEL heating elements. As also the essential information transfer during the manufacturing phase is handled in real time using system which is built to run over the Internet, both the design and manufacturing phase became dramatically reduced and more flexible.

The above described work was carried out as a part of Finnish PROSIT Development Programme [Kekäläinen 1996]. With the representative set of participating companies, the Programme concentrates to area of plant supply industry. The objectives of the programme is to examine, develop, and implement models, networks, alliances and new business activities by utilising new, fast developing world-wide information technology and communication infrastructure possibilities to the plant project business. The overall aim of the programme is to increase the competitiveness of the participating companies in the world-wide plant supply markets.

2. Analysis of information flow

In the Tubel® case, the development of the design process started with the analysis of information flows during the design and manufacturing phase. Normally the design of Tubel is based on a group of specialists of different areas. It is typical that each group of specialist works quite independently with a excellent know-how of their own area mainly. In many cases, it is the information transfer between each group that is responsible for causing delays and sometimes even misunderstandings [Pahl & Beitz 1987, Eppinger & Ulrich 1995].

The figure 1 presents the simplified information flow in the Tubel design and manufacturing. From the figure it can be easily noticed that the information exchange and the interactions between different groups where not optimised and a lot of time was spend for actions that added costs only. Critical actions did not start in time because detail design took too much time. Also the purchase department was overloaded handling information out of their knowledge. As the result of these delays, sub-contracting part suppliers and Tubel-factory had to speed up their production process with tendency to cause quality problems.

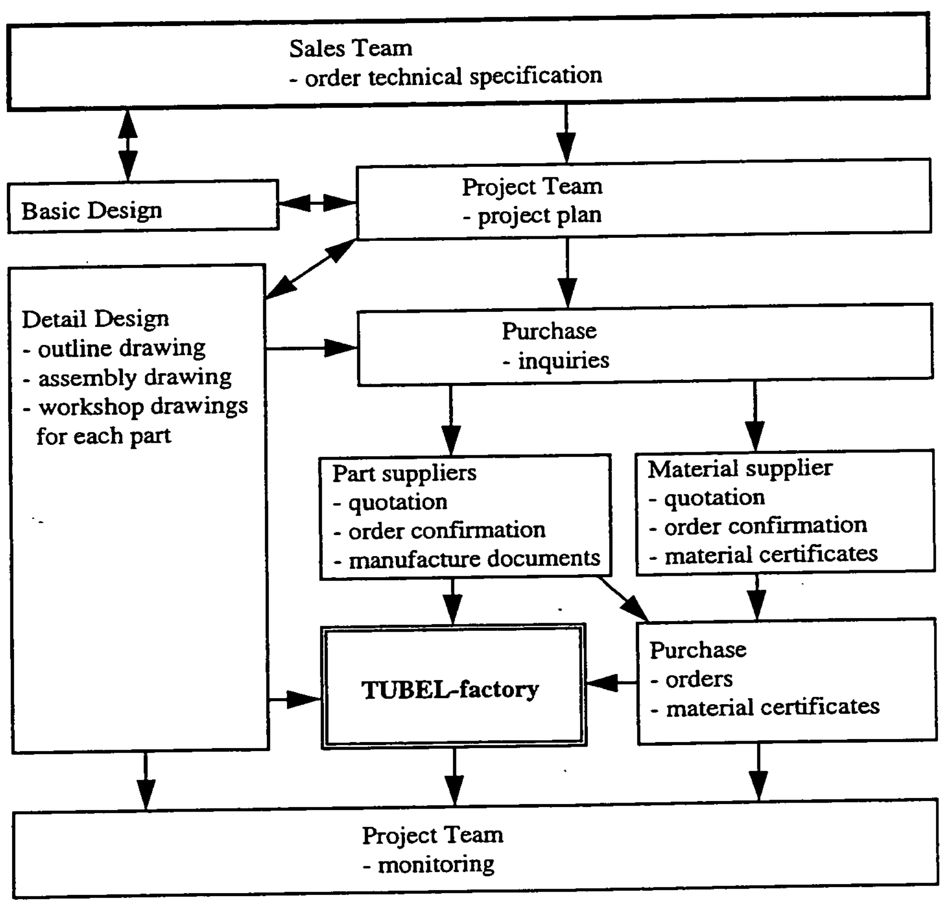

Figure 1. Simplified information flow in Tubel® design and manufacturing.

To solve these problems and make the total lead-time as short as possible following things were done: First, a clear action plan between our own organisations (assemblage, procurement, etc.) and also between our subcontracting suppliers was developed. Also the most critical actions for the total lead-time were derived. These actions were then automated and standardised so that they no longer were that critical.

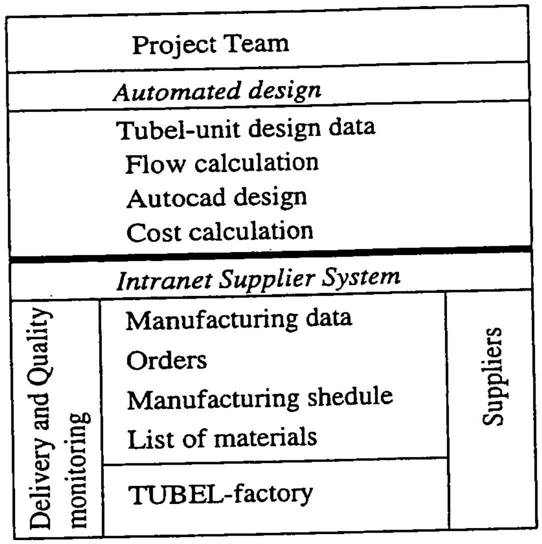

Figure 2. New information transfer in Tubel-product.

Secondly, the designing was automated so that the most critical steps for total lead time can be started at a short notice. After giving the basic parameters concerning the order all needed Manufacturing information will be generated automatically. This information is the input to on-line Intranet Supplier System. When used together, these systems enable the manufacture information of the parts reach our supplier and subcontractors even during the same day that we ourselves get the order.

Thirdly, the chosen stable suppliers, project team and Tubel®-factory are sharing the same information via network. This communication is interactive so that delivery and quality monitoring can be done in real time. Each supplier is committed to maintain the quality we have required and the information to the system as work proceeds. E.g. the calling off the ready parts are handled via network.

The above mentioned improvements outline the new information transfer system presented in the figure 2. Soon after the order has been received, the responsible project team performs the designing of the Tubel -units by using the provided automated design tools. When designer has inserted the general unit performance parameters, the application launches the flow calculation module. The flow calculation results are automatically feed into Autocad application, which calculates the number of required tube elements, defines the layout of tubes and generates layout drawings. The tube layout data is transferred back to Excel application, which automatically generates all other additional documents needed in ordering and manufacturing. As a results of the design phase, these documents are made available to the Intranet Supplier System, which allows all subcontracting suppliers, Tubel factory as well as internal delivery and quality monitoring units to access and update the information on-line.

3. Parametric product model

Each customer has own demands concerning the size and the power of the the evaporator. This means that some parts of the tubel has an an unique shape and size. Normally this means a lot of design work after the order. That raises the lead time. The key to handle this huge amount of information is the advanced product model and the databases.

Each tubel will fulfil same functions. This means that product model will not chance in a system level [Hubka, 1984]. Chances which will normally occur are mainly scaling the parts. Scaling does not affect changes to the product model in any level. Only some special demands will affect changes to the model in part level.

When analyzing the product model we have noticed that the customer requirements are usually connected to few functions of the Tubel. That means that only those parts which are carrying out those functions have to be changed.

Using this information the construction of the Tubel is standardised to be variable means that details of the parts concerning manufacturing and pressure vessel calculations are fixed. There are many commonly accepted analysing techniques available in the literature and standards for the details of pressure vessels and process plant pipes [Kesti 1992, Howard 1963]. Other factors are being left as loose as possible in the chosen range of functionality. With these standardised constructions it is possible to make different size of evaporators exactly the same way. Although heating area varies in quite large scale, on detail level nothing is changed.

Each part has standard drawing which can include parameters. Parameters are given for each evaporator separately at the Intranet Supplier System. All of the part drawings need not to be updated for each project or unit, but the assembly drawing must be done for each evaporator separately. While suppliers are manufacturing the parts we are designing the assembly drawing for Tubel-factory.

Each Tubel evaporator has it's own manufacturing process, where all documents are done independently. Each part has coded marking to show it's place at the assemblage. Tubel evaporator parts are manufactured the amount which is needed at the unit assemblage so the stock is not needed to maintain. When assemblage starts at Tubel-factory all necessary parts will be ready.

By using the developed parametric product model and automated design tasks, it became possible to remove many of the earlier boundaries of information transfer. The necessary knowledge was integrated into user friendly Tubel -software. The design system was build by using Microsoft Excel 5.0 VBA macro language. Towards the multidiscipline project environment the design system functionality was extended with the Intranet Supplier System.

4. Intranet Supplier System

The idea of the Intranet Supplier System is that once the information has been generated and put in to the system, it is available for everyone who needs the information. By using the system, Project team, Tubel factory and subcontractors will have the same, reliable manufacturing information available at the real time. The material specifications, parametric manufacturing data and the manufacturing schedule of each unit are available just when they need it. For the archiving and off-line inspection of the documents, system also provides specialised formats.

The system works both ways and also the suppliers are able to input information to the system. V'..en suppliers have ordered materials they will add confirmation to the material specifications and when the material arrives they input the heat and the certificate numbers. When parts are ready to be delivered to the next supplier or to the Tubel factory, the supplier will confirm the delivery times to the system.

The preliminary manufacturing schedule was calculated at the beginning of the project by using the nominal production times. By checking the actual delivery times against the preliminary schedule, all participants can monitor the progress of the project. The preliminary schedule is not however absolutely restrictive and the suppliers can fully take advantage of the increased manufacturing time. can decide between themselves the real manufacture schedule within the given limits.

Intranet Supplier System was build upon the parametric design system. After the designing all required documents are automatically convert into HTML -format and put in to the on-line system. For the users the documents are served over the Internet by WWW-server running on Windows NT environment. The interactive HTML -forms allow users to transfer the additional new information directly into the on-line database. Also an interactive bulletin board has been incorporated on the system. Data security in the system is handled by using necessary firewall arrangements, IP -address recognition and specific user accounts.

5. Conclusions

As the result of the work done in the Tubel® case, following benefits were recognised:

1. The materials and manufacturing are possible to be ordered in couple minutes. Earlier it took almost one month per the unit.
2. For the standardised parts manufacture can start as soon as the raw material is available. It is not needed to wait assembly drawings.
3. The total costs and the manufacture schedule are known in advance. The work load can be optimised.
4. The stable suppliers are committed to follow our rules. The quality and the delivery time defined by us will be improved.
5. The data transfer will be solid and sharp, the total quality will be better.

In the near future, Kvaerner Pulping will move the Tubel-factory to Sweden while the chosen stable subcontractor network will still remain in Finland. This will further increase the importance and need of information transfer done through Intranet Supplier System. By using the Intranet Supplier System Kvaerner-Pulping is able to optimise it's own work load and give also to suppliers enough time to make their own optimisation. Before the transportaion, all parts for each evaporator are collected at one supplier who is making the final inspection.

The team work with constant suppliers has also developed cost saving manufacturing techniques. The Intranet Supplier System has shortened total lead time significantly without difficulties. In future, we shall add the automatic mail system to the Intranet Supplier System to further support the information change. We are also looking after other products where similar systems could be applied.

References:

Eppinger, S., Ulrich K. 1995. "Product Design and Development". McGraw-Hill Inc. 289 pp.

Howard, F. R., "Piping design for process plants", John Wiley & Sons New York, 1963

Hubka, W., Eder W. E., 1984. "Theory of Technical Systems". Springer-Verlag Berlin, Heidelberg, 275 pp.

Kekäläinen, H., Kuuskoski P., 1996, "PROSIT Development Programme", http://www.logistix.fi/prosit.htm

Kesti, M., 1992. "Teollisuusputkistot". Valtion Painatuskeskus, Helsinki, 143 pp.

Pahl, G., Peitz, W., 1986. "Koneensuunnitteluoppi". FIMET, Helsinki. 608 pp.

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